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Principles of Dental Public Health

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Mae, Cornelia, and Rose

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Preface

This book is designed both for the student and for the general practitioner of dentistry. It gives an introduction to the broad field of public health and also detailed, specific material upon the development of dental public health programs. Previous textbooks on dental public health have dealt almost exclusively with the dental aspects. This was a good method of approach if the text was to be used for teaching purposes in a situation where lecturers upon the broader aspects of public health could fill in the background material. The practicing dentist, however, suddenly finding himself so placed that he must design or participate in a community dental health program, needs to know more than mere dentistry. He needs to know the frame of reference in which his efforts will fit. He can read basic texts upon public health but will find them designed for the physician and filled with much detail which will appear irrelevant to him as a dentist. He needs a simplified approach to public health practice and he needs, particularly, an elementary knowledge of those tools of public health which will help him design and operate his own program. By tools we mean those basic sciences such as biostatistics and epidemiology which are essential to all study of mass disease, whether it be systemic or dental. The problems of dental disease are primarily those of chronic disease, the field toward which medicine is turning its sharpest attention these days and a field where epidemiology and biostatistics are indispensable aids.

This book is, in a very real sense, the crystallization of a course in dental public health which has been presented since 1947 to upper-class undergraduates at the Harvard School of Dental Medicine, and since 1955, in more or less the same form, as an evening course for graduate dentists. Both student groups have been very rewarding, though in different ways. The undergraduates are closer to their period of basic science training in the Medical School. They give evidence of better background and of greater interest in the material grouped together under the heading "Tools of Dental Public Health." The graduate group, with practical experience back of them, are more specifically interested in dental program planning. For the members of this group, the course has been their first contact with the broad field of public health, and they show great eagerness to understand the framework of public health administration within which they are operating. Both groups appear interested in continued education in dental public health as, chiefly because of the advent of fluoridation, they find themselves for the first time in history possessed of preventive techniques which can be applied at the community level. From these experiences, and from others, the writer sees clear evidence of the need for a textbook on dental public health which will reach all practitioners of dentistry and which will stand on its own feet as reading material for those practitioners unable to obtain formal teaching in the subject.

A book of this sort can only serve as an introduction to the larger field of public health. Biostatistics, for instance, is an extremely hard subject to learn by oneself. The chapters on biostatistics here are designed merely to present the statistical point of view, including the concept of variability and a few of the simpler tests commonly needed in the dental field. Students going more deeply into this field will not only need more advanced textbooks but also good teachers. The material on public health administration and personnel management is merely an introduction to a large field in which practical experience counts heavily. The dentist who suddenly finds himself in charge of a large working force will need additional help. This he can obtain from some of the

textbooks referred to in the lists of references, and also by seeking aid from his public health colleagues. In the field of preventive dentistry, this book treats dental caries, periodontal disease, oral cancer, and the like in such a way as to give a basic understanding of their earlier signs and of those mass phenomena which are of interest from a public health point of view. The refinements of oral pathology can be learned from textbooks specifically devoted to this subject.

To the teacher of dental public health, this book should have value as a teaching outline, either for undergraduate dental students or for postgraduate students. Around it can be built a course which will have both breadth and detail, the detail often supplied by specialists from the areas outside dentistry, where these are available. Where the teacher must do most of the work himself, it is hoped that by reading as far as he can in the reference material which is presented here he will be able to do a reasonably good job. Hopefully, he will enjoy his teaching work as much as has the author over the past decade.

As in all textbook writing, the writer is deeply indebted not only to a number of publishers and authors whose specific contributions are noted at appropriate points, but also to these and many other workers and teachers in the fields of public health and of dentistry whose points of view and whose phraseology have influenced the writing of this text. Certain well-turned phrases and certain basic concepts become the vocabulary of any specialized field and it is often impossible to credit the originators of these. More particularly, the writer wishes to express his gratitude to several colleagues who have read the manuscript of this book and offered constructive criticism. Among these are Louis J. P. Calisti, Robert L. Glass, John E. Gordon, Demetrios M. Hadjimarkos, Leon B. Leach, Hugh R. Leavell, Benjamin F. Paul, Robert B. Reed, James H. Shaw, Reidar F. Sognnaes, William D. Wellock, and Marjorie A. C. Young. Within the writer's immediate family, his wife Mae and daughter Cornelia have given particularly helpful advice. He is also indebted to Laurence B. Brown for the preparation of most of the illustrations, and to Ruth M. Powers and several other loyal secretaries and typists for the preparation of the manuscript. To his father, the late William B. Dunning, he is indebted for leadership both in dentistry and in writing. Dr. Dunning saw the first chapter of the book in time to lend it his encouragement.

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Background

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Public Health: Reasons and Definitions

For dentists, whose profession over the past century has been built upon the high-quality restorative treatment performed by private practitioners, public health is a new subject. It is a subject, however, to which dentists turned inevitably, once the almost universal prevalence of dental disease became an established fact. In a country where the principle of equal rights among men was taken seriously, it was impossible that any profession could concentrate its entire attention on elaborate care for a privileged group to the exclusion of the needs of the great masses of the population.

The problem of providing dental care for entire populations involves methods and concepts which are new and challenging to the average dentist. Prevention takes on a new meaning, where manpower is obviously insufficient to render all needed restorative care. Teamwork becomes a necessity in extending the scope of care to the utmost consistent with work of good quality, and group financing must be undertaken to aid the individual patient in the lower

income bracket. The test of any public health measure now becomes, "how much will it do for the fellow who can't afford private care?" This is a fruitful new field for the dentist to enter. It makes him one with the social planners and the health officials who are prime movers in making his community a good place to live in.

The transition from the private practice point of view to the public health point of view can become easy if a few important similarities are borne in mind. There is still an operator: not one man in a white coat, but a public health team variously attired and with various skills. There is still a patient: not one person with a complaint to treat, but a community composed of many persons, some with complaints, some with undiscovered disease, and some healthy. Surveying and evaluation are the community equivalents of diagnosis. Actual methods of health education and of treatment differ only slightly from those of the private office, and the basic principles are unchanged. Society is composed of individuals.

Public health, as an organized effort to protect the well-being of the human race is a development of many centuries' standing, perhaps almost as old as its parent discipline, medicine. Among the earliest recorded health codes are those of the Mosaic law of the Hebrews, in the first books of the Bible. Isolation of cases of infectious disease is provided for; dietary rules are laid down, some of them arbitrary to a modern viewer but most of them recognizably useful in controlling infectious disease. Here was a strong society acting for its own protection.

The late Charles-Edward A. Winslow of Yale has given us an excellent definition of public health, as "the art and science of preventing disease, prolonging life, and promoting physical and mental efficiency through organized community effort." The important concept in this sentence is contained in the last words, through organized community effort. No longer is the individual patient the sole object of study, but the entire community. This includes not only the sufferers from disease in all degrees of severity, from the subclinical to the fatal, and those persons who have been left disabled in the wake of disease, but also well people, both resistant and susceptible to disease. The positive nature of the modern concept of health is well stated by the World Health Organization in its constitution: "Health is a state of complete physical, mental, and

social well-being, and not merely the absence of disease or infirmity."

Historically, many public health programs have evolved as the result of the inability of some group within the population to receive adequate treatment for existing disease. Thus the first activity of the United States Public Health Service, upon its organization in 1798, was a medical care plan; later a chain of hospitals was established for seamen unable to obtain medical care through other means. This was essentially an extension of private medical care, but a group was at the giving end and a group at the receiving end. As group techniques evolved, they were applied to the well in addition to the sick, until now the preventive services of the U. S. Public Health Service constitute a far more important endeavor than its medical care services.

In dentistry there has been an exactly similar transition. A century ago dentistry consisted only of careful restorative work for those individuals afflicted with dental disease and able to pay for treatment in private offices. About 1910 the first large institutions were formed to give dental care to indigent groups: the Forsyth Dental Infirmary for Children in Boston, and the Eastman Dental Dispensary in Rochester, New York. Even this was not public health as we know it today. Practical preventive methods for dental disease did not exist of a type to justify community dental health programs. Today the story is different. Oral hygiene, diet, water fluoridation, and topical fluoride application are all practical enough now to form good bases for community-wide programs to prevent dental caries. Water fluoridation presents a problem which precipitates the dentist into civic affairs alongside other public health workers who have taken a deep interest in this measure. These matters, and the health education to get them across, are the real core of dental public health.

It is very natural that dentistry, in looking beyond cure to prevention and thus entering the field of public health, should use many of the techniques of value in the medical field, but also that it should develop some new techniques due to the unusual nature of dental care. This book will be devoted to a study of those aspects of public health methodology most relevant to dental health and to a study of those particular dental methods which aid the planning of programs in the dental field.

Some Characteristics of the Public Health Method

Public health work exhibits certain characteristics of its own that are different from individual practice in the same field. Most important perhaps is the fact that public health work must be done in areas where group responsibility is recognized. For this reason contagious diseases received some of the earliest attention, since it was obviously a group responsibility that a man be safe from his neighbor. This concept led first to quarantine and isolation procedures, later to the mass preventive measures that loom so large today. Acute communicable diseases were the earliest to demand attention. Success in controlling many of these, as the science of bacteriology gave the means for doing so, led to a shift of attention, in the more developed countries, to chronic disease. This is the focus today. It is due in part to the fact that people live long enough now to fall victim to degenerative diseases they seldom had a chance to contract a century ago.

Group responsibility has also been recognized from the start in the area of the indigent. The completely indigent have been the easiest to recognize, as in the case of the destitute merchant seamen. Later on came the concept of *medical indigence*: an inability to pay large bills for medical care. This situation is found chiefly in the area of chronic disease, where the life savings of otherwise independent people are easily wiped out. Thus cancer has become a public health problem in recent years. The processes involved in screening for cancer are expensive in themselves, and the disease, once contracted, is extremely expensive to treat.

Another characteristic of the public health method is its reliance upon teamwork. This is due partly to the necessity of efficient handling of large groups of people and partly to the fact that many processes which are involved in prevention lend themselves particularly well to teamwork. Physical examination of school children for gross defects is a good example here. The same work could be done by private physicians in their own offices, but it is far easier to handle large groups of children in institutional surroundings, with systematic delegation of many procedures to properly supervised auxiliary personnel.

A further characteristic of public health work lies in its ability to deal with all sorts of problems involving the host population and the environment, beyond the range of the individual physician or

dentist. No longer need a disease be considered a phenomenon caused by one "agent" within the individual patient. The disease can be studied community-wide and can be recognized for what it really is: a multifactorial problem. This introduces a new complexity into the search for causes of disease, and has given rise to the science of epidemiology, which has been called "the diagnostic procedure in mass disease." 2 Even in a disease as clearcut as measles, the epidemiologist will look for host factors and environment factors and try to control them. These factors are often seen much more clearly when a group is studied, rather than an individual. Every disease is thought of in terms of a chain of causation, and that chain can be broken either at the easiest spot, if such can be found, or at various spots. In a disease where no one preventive measure is highly effective or where exact causative factors are not known, a shotgun approach to various factors may possibly prove the most effective. This is often true of dental caries, as will be seen later. The science of epidemiology has been built up around the concept of multifactorial disease and the medical detective work needed to uncover various factors. Originally dealing only with epidemics of contagious disease, the epidemiologist now deals with all sorts of problems where his methods will apply, even automobile accidents.

The necessities of epidemiologic work have given rise to another characteristic of public health work which differentiates it from private practice: dependence on the biostatistical method. The existence of a disease in an individual patient can usually be described on a yes-or-no basis. This same disease would probably be present at all times in a large population group, its frequency affected by a multiplicity of factors. The time factor becomes important, since changes in the prevalence of disease can be measured only by observations over a number of years. These problems require accurate measurement of rates and lead us to the question whether differences between rates are real or are merely chance phenomena. Mathematical measurement of probability becomes necessary. The aim of biostatistics is not to erect complicated mathematical pyramids upon possibly shaky foundations, but to appraise the variability and the errors to be found in almost all arithmetic measurements of disease in large populations.

A final characteristic of public health is that, through his efforts to attain prevention of disease, the public health worker deals with